WHAT IS CLAIMED IS:

1. A line based image matching method comprising:

collecting line information of a query image and model images;

defining a binary relation between lines of the query image and lines of the model images;

measuring compatibility coefficients of node-label pairs of the query and model images based on the binary relation; and

measuring the similarity between the query and model images on the basis of continuous relaxation labeling using the compatibility coefficients.

2. The line based image matching method of claim 1, wherein the line information of each of the query and model images is expressed by shape descriptors.

3. The line based image matching method of claim 1, wherein the model images are retrieved from a database indexed by shape descriptors determined by:

extracting the skeleton of a model image;

thinning the skeleton;

concatenating corresponding pixels based on the extracted skeleton to obtain a set of lines; and

normalizing the set of lines to determine the normalized set of lines as the shape descriptors.

4. The line based image matching method of claim 1, wherein the binary relation is invariant with respect to rotations, scale changes and translations.

5. The line based image matching method of claim 4, wherein the binary relation includes at least one of an angular difference between two lines, a ratio of the lengths of the two lines, a relative location of the two lines, and a relative distance between the two lines.

6. The line based image matching method of claim 1, wherein measuring the compatibility coefficients of the node-label pairs based on the binary relation comprises:

measuring the binary relation, denoted by ξ_{ij}, for two nodes i and j within the set of lines of the query image;

measuring the binary relation, denoted by $\xi_{\lambda\lambda'}$, for two labels λ and λ' within the set of lines for each of the model images; and

measuring the compatibility coefficients, denoted by $r_{ij}(\lambda, \lambda')$, for the node-label pairs of the query and each of the model images.

7. The line based image matching method of claim 6, wherein the compatibility coefficients $r_{ij}(\lambda, \lambda')$ as a measure of the strength of

compatibility between the node-label pairs have high values corresponding to compatibility and low values corresponding to incompatibility.

8. The line based image matching method of claim 6, wherein the compatibility coefficients $r_{ij}(\lambda, \lambda')$ are determined as 1 if the binary relation of a node pair (i, j) of the query image coincides with the binary relation of a label pair (λ, λ').

9. The line based image matching method of claim 6, wherein the compatibility coefficients $r_{ij}(\lambda, \lambda')$ are expressed as:

$$r_{ij}(\lambda, \lambda') = \frac{1}{1 + \|\rho(i, j, \lambda, \lambda')\|}$$

where $\rho(i, j, \lambda, \lambda') = (\sum_{k=1}^{K} \|\xi_{ij}^{(k)} \xi_{\lambda\lambda'}^{(k)}\|^{\alpha})^{1/\alpha}$, "K" denotes the number of elements of a character vector for a defined binary relation; and "ρ" is a measure of the difference in compatibility between node-label pairs.

10. The line based image matching method of claim 1, before measuring the similarity on the basis of the continuous relaxation labeling, further comprising assigning a uniform initial probability to a predetermined number of upper node-label pairs in which the sums of the highest degree of support by each adjacent label for the nodes are within the range of an upper level, the initial probability being close to the final probability.

11. The line based image matching method of claim 10, after assigning the uniform initial probability to the upper node-label pairs, further comprising defining a probability update element for the continuous relaxation labeling as:

$$q_i^{(k)}(\lambda) = \sum_j \alpha_i (\sum_\lambda r_{ij}(\lambda,\lambda') p_j^{(k)}(\lambda'))$$

where $p_j^{(k)}(\lambda')$ denotes the node-to-label correspondence probability, and k denotes the number of iterations needed.

12. The line based image matching method of claim 11, after defining the probability update element, further comprising updating the probability on the basis of the Zucker's theory using

$$p_i^{(k+1)}(\lambda) = p_i^{(k)}(\lambda) + p_i^{(k)}(\lambda) \frac{q_i^{(k)}(\lambda) - \overline{q_i^{(k)}}}{q_i^{(k)}}$$

where $q_i^{(k)} = \sum_j \alpha \sum_\lambda r_{ij}^{(k)}(\lambda,\lambda') p_j^{(k)}(\lambda')$, and $\overline{q_i^{(k)}} = \sum_\lambda p_i^{(k)}(\lambda) q_i^{(k)}(\lambda)$.

13. The line based image matching method of claim 1, wherein measuring the similarity between the query and model images comprises:

calculating the sum of the distances between corresponding node-to-label pairs of the sets of lines for the query and each of the model images; and

determining the reciprocal of the sum of the distances as the similarity between corresponding two images.

14. The line based image matching method of claim 13, wherein the distances are measured using the Euclidean distance or the Housdorff distance.